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Inquiry learning to improve critical thinking skills and student learning outcomes

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ABSTRACT

This study aims to identify the process and results of the application of the Inquiry learning method in improving students' critical thinking skills and cognitive learning outcomes.This study was conducted in two cycles using the Classroom Action Research (CAR) approach with the Kemmis and McTaggart (1988) spiral model, which consists of four stages: planning, implementation (acting), observation (observing), and reflection (reflecting). The subjects of the study were 27 students of grade IX B of Mts Muqimus Sunnah Palembang. The results of data analysis showed an increase in students' daily test scores, which reflected improvements in their cognitive learning outcomes, where out of 27 students, 81.48% achieved learning completion and based on the results of observations, it was found that the application of the Inquiry learning method assisted by LKPD was proven effective in improving students' critical thinking skills and cognitive learning outcomes.

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1. INTRODUCTION

Education in schools aims to form qualified human beings who are able to adapt to their social environment. Teaching in schools not only aims to prepare learners to face a fixed world, but focuses more on equipping them to face changes and challenges in an ever-evolving life. One of the goals of education is to develop learners' critical thinking skills. Critical thinking skills are essential in dealing with problems and challenges in everyday life. Critical thinking and creative thinking are part of higher order thinking skills (HOTS). Experts have put forward various definitions related to critical thinking skills, one of which is Sukmadinata in (Rosmaiyadi, 2017) states Critical thinking is also stated as the ability to reason structurally and systematically to evaluate, solve problems, make decisions, build beliefs, analyze assumptions, and conduct scientific exploration. (Phasa, 2020) . A person's critical thinking skills can be developed through the application of an appropriate learning model. One of the effective learning models for this purpose is the guided learning or inquiry model

The inquiry learning model is one of the learning models that involves students in the learning process to find answers to problems independently. According to Hanafiah in (Wicaksana et al., 2022) states that the inquiry learning model is the involvement of students in a series of learning through analytical and critical thinking in finding independent answers to the problems asked. While Trianto in (Adiqka Putri et al., 2015) states that Inquiry is a process that begins with formulating problems, formulating hypotheses, collecting information, analyzing data, and drawing conclusions. The use of inquiry learning models is very appropriate to teach subject matter that is analysis and identification such as mathematics.

School mathematics is one of the subjects taught from elementary school to university. School mathematics lessons are generally hierarchical and characterized by inquiry. Many materials in mathematics lessons require in-depth investigation and through a gradual thinking process. One of them is the material of flat-sided space building, including the space building of Limas and Prisms.

Based on information obtained by researchers, the difficulty of MTs Muqimus Sunnah Palembang students in understanding flat-sided space building material, especially the material of prisms and pyramids, mostly occurs because students are not given the opportunity to explore their knowledge through experiments on these spaces so that terrace

learning is less meaningful. In addition, students are not given the opportunity to develop their critical thinking skills so that students become passive and untrained in the process of understanding the material through the discovery process. Critical thinking in mathematics lessons is very important as conveyed by Glazer in (Rosmaiyadi, 2017) Critical thinking in mathematics is defined as the ability and tendency to integrate prior knowledge, mathematical reasoning, and cognitive strategies to generalize, prove, or evaluate unfamiliar mathematical situations reflectively. Based on this, we can understand why the learning outcomes of students on this material in recent years have been below the expected Learning Objective Achievement Criteria (KKTP) value of at least 70

We have often encountered research involving critical thinking and inquiry learning models, including research (Wasqita et al., 2022) which examines critical thinking in terms of learning styles, then research (Sofyan et al., 2022) and (Nurfauziah & Sari, 2018) also discuss critical thinking.

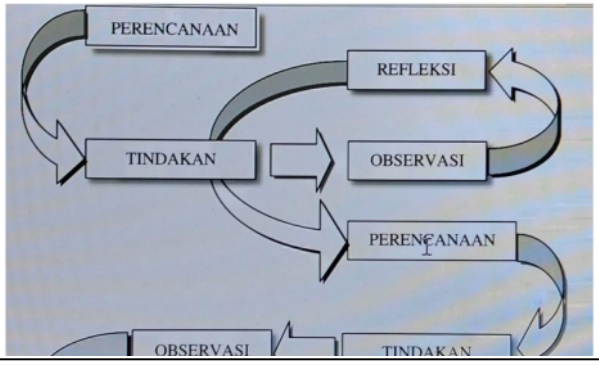
2. METHODS

The research method applied is Classroom Action Research (PTK). According to Arikunto in (Abdussamad, 2021) (Rohman et al., 2023) PTK is a type of research that allows schools, with the support of teachers or research partners, to carry out studies to evaluate the implementation of the learning process that takes place in the classroom.

MTs Muqimus Sunnah Palembang was chosen as the research location, which was carried out in the 2023/2024 academic year in the even semester. The subjects of this study were students of class IX.B, consisting of 27 people. The research used the model developed by Kemmis and McTaggart, which includes four main stages, namely planning, implementation, observation, and reflection. These four stages are summarized in one research cycle. Each cycle was carried out in three meetings, with one of the meetings used for the implementation of the test in the form of a written test.

This study aims to analyze the improvement of learning outcomes and critical thinking skills of students on flat-sided space building material, especially Limas and Prisms delivered through an inquiry learning model.

The following is the PTK design according to Kemmis and Mc Taggart:



3. FINDINGS AND DISCUSSION

The implementation of classroom action was carried out in two cycles, where each cycle consisted of three meetings. Each meeting lasts for two lesson hours. After the three meetings are completed, a test will be given at the end of each cycle

3.1 Cycle 1

Cycle 1 was carried out based on the rules contained in the implementation of PTK, namely the planning stage, the implementation stage, the observation stage and the reflection stage. In the planning stage, researchers took several steps, which will be used during the implementation stage, namely: (1) preparing the syllabus, (2) preparing teaching modules with an inquiry learning model, (3) preparing LKPDs that are prepared using critical thinking indicators as learning aids, (4) compiling observation sheets to observe the activities of researchers and students during the learning process, and (5) preparing final tests for cycle I.

The implementation stage is the stage of teaching and learning activities in the classroom, at this stage learning is carried out in accordance with the design of the teaching module that has been prepared during the planning stage, LKPD which is prepared using critical thinking indicators is used as a learning tool and at the end of this stage an evaluation is carried out to measure the extent of student learning outcomes. Furthermore, the observation stage is carried out, this stage runs in harmony with the implementation stage. In this stage, researchers make observations of the ongoing learning process, both on the activities of researchers as teachers and on student activities. Previously, the researcher had prepared an observation sheet which was then given to the observer. During the implementation of the actions in cycle I, there were several descriptors that had not been fulfilled, as described in the results of the following observations of the activities of researchers and students.

From the three stages above, it is known that the test in cycle I was attended by all students of class IX B MTs Muqimus Sunnah Palembang, totaling 27 people. Based on the

test results, 16 students scored ≥ 75 in accordance with KKTP with a percentage of completeness reaching 59.24%. The following is a table of cycle I results

Table 1. Cycle 1 Test Results

Value	Total	Percentage
≥ 75	16	59, 24
< 75	11	40, 76
Total	27	100

Data analysis of observation results was carried out using the percentage analysis method. The scores obtained from each indicator were summed up to get the total score. Then, the percentage of the average value is calculated by dividing the total score obtained by the maximum score, then multiplying it by 100%. The calculation formula can be written as follows:

$$\text{Percentage of average value (NR)} = \frac{\text{jumlah skor}}{\text{skor maksimal}} \times 100\%$$

Based on the observation results, the average percentage of the implementation of the learning process reached 71.43%. This shows that the success rate of the learning process carried out by researchers has not been achieved. While for the activeness of students, the average percentage of the implementation of the learning process reached 73.21%. After reflecting on the activities in cycle 1, it shows that the level of success of the learning process by students has not met the established criteria, so it is necessary to carry out stage 2.

3.2. Cycle 2

Implementation of cycle 2 is carried out by re-staging the activities in cycle 1, with some necessary improvements. After carrying out the stages of activities in cycle 2, the results of 27 students were as follows:

Cycle 2 Test Results

Value	Total	Percentage
≥ 75	22	81,48
< 75	6	22,22
Total	27	100

For the observation analysis data in cycle 2, the average percentage of the implementation of the learning process reached 87.50%, and for the percentage of student activeness reached 85.71%. This shows that the level of success of the learning process and activeness of students has met the criteria for completeness.

4. CONCLUSION

Based on the research results, findings, and previous discussion, it can be concluded as follows:

Learning using the inquiry learning model proved to be able to improve students' critical thinking skills and learning outcomes. This can be seen from the increase in the completeness of students' final test results, from 59.24% in cycle I to 81.48% in cycle II. The results of observations made of the activities of researchers and students during the learning process show that the application of this learning can improve the quality of learning. and succeeded in increasing student activeness, fostering self-confidence, and making students more enthusiastic in participating in learning.

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